OccuSwitch DALI

User Manual

3222 636 49461
July 2011

This manual covers the following products:

LRM2070, LRM2071, LRM2072
LRM2080, LRM2081, LRM2082
LRM2090, LRM2091 only partly, BMS integration not included
LCU2070, LRH2070, LCC2070, LCC2080
It does NOT cover the LRM2095

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1. Introduction to the OccuSwitch DALI

OccuSwitch DALI is a lighting dimming system for offices, schools, meeting rooms, storage rooms, restrooms and other indoor locations. The OccuSwitch DALI dimming system is a combination of daylight depending regulation, occupancy control and manual control. The system automatically turns the lighting in a room on and off based on occupancy. When enough daylight (natural light) enters the room, the system dims the luminaires (artificial lights).

OccuSwitch DALI is a combined sensor and controller. It has three main functional parts: a light sensor for daylight depending regulation, a movement detector for occupancy control and an infrared receiver for remote control.

The OccuSwitch DALI has options for local override, parallel operation and network links to Building Management Systems (BMS).

The specific OccuSwitch DALI BMS and DL (LRM209x) functions are not discussed in this manual.

Table 1: Main technical features

Feature	**Description**
Number of ballasts per OccuSwitch DALI	Maximum of 2 extension sensors and 15 ballasts per OccuSwitch DALI.
Parallel linking	Maximum of 22 OccuSwitch DALI (Advanced) linked in parallel.
Detection area	Office area of 20-25 m2, or a classroom of around 48 m2. Detection area optionally extended with an extension sensor.
Mounting	Optimized for recessed ceiling mounting and for mounting heights between 2.5 and 3.5 meter.
Application modes	10 available modes to suit different locations.
EnOcean® technology	Optional interface that allows using EnOcean® switches from third parties. Both 1 and 2 channel switches can be used.
Building Management Systems (BMS)	Up to 64 OccuSwitch DALI LRM2090 devices can be linked to standard DALI interfaces.

2. Operating principle

2.1. OccuSwitch DALI versions

The following products are available for the OccuSwitch DALI lighting dimming system:

Table 2: OccuSwitch DALI products

OccuSwitch DALI product	Description
LRM2070 OccuSwitch DALI Basic	Stand alone system with 2 DALI output connectors for window and corridor installation.
LRM2071 OccuSwitch DALI Basic with EnOcean	As LRM2070 but with interface for 1- or 2-channel EnOcean switches.
LRM2072 OSD basic NB	Exactly like LRM2070 but without Philips logo on the front plate
LRM2080 OccuSwitch DALI Advanced	Stand alone system with 2 DALI output connectors. One connector is programmable for the luminaires. The other connector forms a parallel link to up to 22 different OccuSwitch DALI systems.
LRM2081 OccuSwitch DALI Advanced with EnOcean	As LRM2080 but with interface for 1- or 2-channel EnOcean switches.
LRM2082 OSD advanced NB	Exactly like LRM2080 but without Philips logo on the front plate
LRM2090 OccuSwitch DALI BMS	Stand alone system with 1 DALI input and DALI output connector. One connector is programmable for the luminaires. The other connector contains a standard DALI interface for connecting to a BMS system, not specifically covered in this manual.
LRM2091 OccuSwitch DALI BMS with EnOcean	As LRM2090 but with interface for 1- or 2-channel EnOcean switches, not specifically covered in this manual.
LRM2092 OSD BMS NB	Exactly like LRM2090 but without Philips logo on the front plate, not specifically covered in this manual.
LRM2095 OSD DL	Dynamic Lighting version, not specifically covered in this manual.

The following accessories are available for the OccuSwitch DALI lighting dimming system:

Table 3: OccuSwitch DALI accessories

	OccuSwitch DALI accessory	Description
	LRM8118 extension movement sensor	The LRM8118 can extend the movement detection area of OccuSwitch DALI: it has the same detection area size as the OccuSwitch DALI. The sensor is connected to the same DALI channel as the luminaires, and does not require mains power.
	LCC2070 standard Wieland cable	Cable for OccuSwitch DALI Basic systems LRM2070 and LRM2071.
	LCC2080 standard Wieland cable	Cable for OccuSwitch DALI Advanced systems LRM2080 / LRM2081 and OccuSwitch DALI BMS systems LRM2090 / LRM2091.
	LRH2070 surface mounted box	Box for mounting the OccuSwitch DALI system (all types) onto the ceiling. The box is equipped with mounting holes for standard BESA boxes and socket plates.
	IRT8097 (OmniProg Easy) simple commissioning tool	Tool capable of limited commissioning. Batteries included.
	IRT8099 (OmniProg) advanced mode selection / commissioning tool	Tool capable of full commissioning. Batteries included.
	IRT8010 two-key remote control	Infrared single-channel switch for the OccuSwitch DALI system. A wall holder is separately available. Batteries included.
	LRH8010 wall holder	Holder for remote control IRT8010.
	IRT8050 two-key remote control	Wall-mounted or tabletop infrared control of the OccuSwitch DALI system. Can be configured for luminaire group control. Batteries included.
	LCU2070 OSD PBU	Push button interface for OSD

LCU2071 OSD PBU	Push button interface for OSD (LRM2095 only)
UID8510	IR remote control (1 or 2 channels). Batteries are included

2.1.1. OccuSwitch DALI Basic

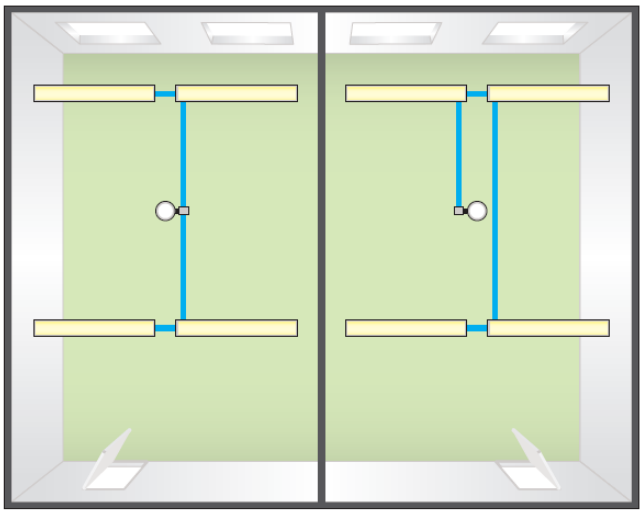


Figure 1: Two cell offices with OccuSwitch DALI Basic installations

The OccuSwitch DALI Basic is a module with 2 DALI output connectors, for window and corridor installation. The OccuSwitch DALI Basic is ideal for separate cell offices. Depending on commissioning and the number of output connectors in use, the OccuSwitch DALI Basic functions as follows:

Table 4: Connectors in OccuSwitch DALI Basic

Number of connectors in use	Uncommissioned system	Commissioned system
1 DALI output connector (DA) used Other connector (X) left open	The system regulates all connected luminaires identically, according to the output connector used. When the window-row connector (DA) is used, daylight regulation can cause the amount of light from the corridor luminaires to be insufficient.	Up to four output groups (window row, corridor row, plus two additional groups) can be set. This allows setting correct light levels for all luminaire groups. The groups do function independently of their physical connection location. For commissioning, see Chapter 4.
2 DALI output connectors used (DA and X)	The system regulates window (DA) and corridor (X) luminaires as separate rows. The corridor row has a set offset from the window row.	

Example

Figure 1 shows an example layout of two simple cell offices: one small and one large. Each office part has its own OccuSwitch DALI Basic and two rows of luminaires (a window row and a corridor row). There are no devices in the office to manually override the automatic lighting control.

In this example, the OccuSwitch DALI Basics in the three office parts (A, B and C) are completely independent of each other: each has an independent occupancy control and daylight regulation.

2.1.2. OccuSwitch DALI Advanced

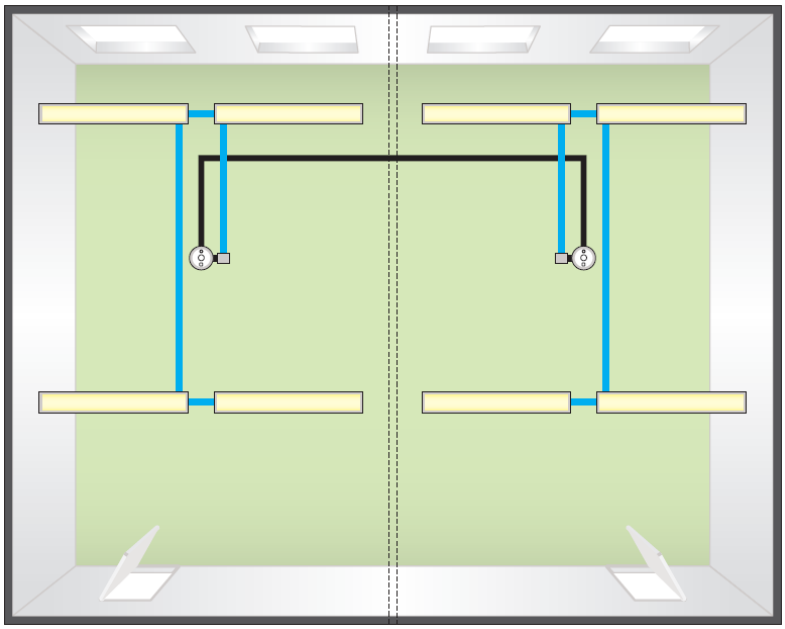


Figure 2: Two grids in one office linked with an OccuSwitch DALI Advanced installation

The OccuSwitch DALI Advanced is a module that allows covering larger areas such as open plan offices. Up to 22 OccuSwitch DALI Advanced modules can be connected in parallel to create lighting zones in an open office. These lighting zones can be used, for example, so that the local lights in one area are switched on at occupancy and the lights of the surrounding areas are automatically set to the background lighting level.

Table 5: Connectors in OccuSwitch DALI Advanced

Output connectors	**Uncommissioned system**	**Commissioned system**
DALI Output connector “DA”	The system regulates all luminaire rows identically. The system sees all luminaires as window row. Daylight regulation can cause the amount of light from the corridor luminaires to be insufficient.	Up to four output groups (window row, corridor row, plus two additional groups) can be set. This allows setting correct light levels for all luminaire groups. For commissioning, see Chapter 4.
Parallel link connector “X”	By default the OccuSwitch DALI Advanced is set to local occupancy (Mode 1). Once one OccuSwitch DALI detects occupancy, all OccuSwitch DALI devices on the same parallel link turn their lights on.	It is possible to set other OccuSwitch DALI devices using the same parallel link to go to background level when one OccuSwitch DALI is occupied (Mode 9).

Example

Figure 2 shows an example layout of a two simple cell offices: one small and one large. Each office part has its own OccuSwitch DALI Advanced and two rows of luminaires (a window row and a corridor row). The two OccuSwitch DALI Advanced in the large office (B and C) are connected via parallel link, so they can share their occupancy status with each other. This means that when someone enters the office in side B, the lights in side B are switched on and side C is signaled. Depending on configuration, the lights in office C are then either switched on or switched to the background level.

2.1.3. OccuSwitch DALI BMS

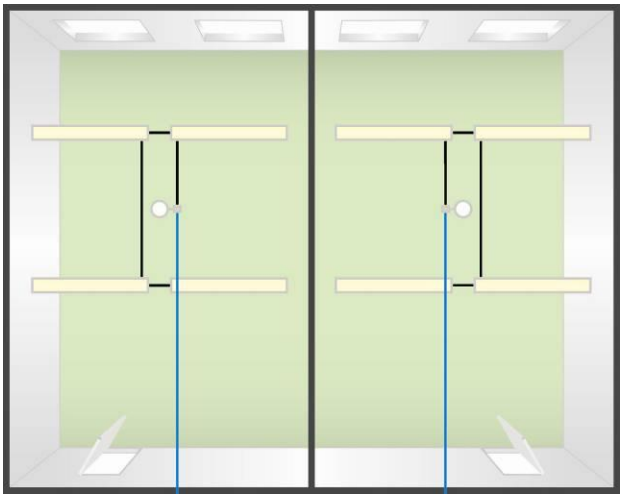


Figure 3: Two cell offices linked to a BMS system

The OccuSwitch DALI BMS is a module that allows connecting a maximum of 64 OccuSwitch DALI devices to a DALI interface, for example of a BMS system. Each OccuSwitch DALI can be assigned to a maximum of 16 groups.

The BMS system can override the local OccuSwitch DALI control. This allows, for example, to switch all lights on when specific alarms occur or to keep all lights off during the night. The BMS system can also retrieve status information from each OccuSwitch DALI device.

Table 6: Connectors in OccuSwitch DALI BMS

Connectors	Uncommissioned system	Commissioned system
DALI output connector	The system regulates all luminaire rows identically. The system sees all luminaires as window row. Daylight regulation can cause the amount of light from the corridor luminaires to be insufficient.	Up to four output groups can be set. This allows setting correct light levels for the luminaire groups. For commissioning, see Chapter 4.
DALI input connector	Complete standard DALI interface for connecting to any DALI system. For commissioning, see Chapter 4.	

Example

Figure 3 shows an example layout of two cell offices: one small and one large. Each office part has its own OccuSwitch DALI BMS and two rows of luminaires (a window row and a corridor row). The OccuSwitch DALI devices are not directly linked to each other, but are connected to a BMS system.

Both OccuSwitch DALI BMS systems control the connected lights automatically. The BMS system is used to monitor the system and to override the local settings in special situations.

2.1.4. Extension movement sensor

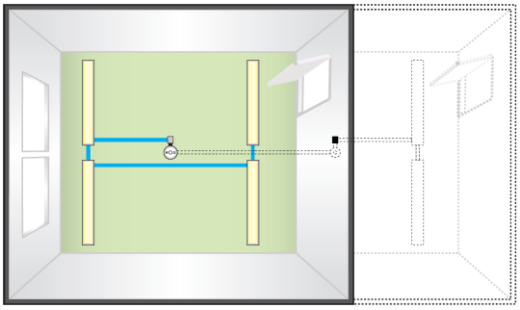


Figure 4: OccuSwitch DALI with an extension movement sensor

The extension sensor (LRM8118) allows enlarging the movement detection area of any OccuSwitch DALI. The sensor is connected to the same DALI line as the luminaires. When the extension movement sensor detects occupancy it sends a trigger to the OccuSwitch DALI. The OccuSwitch DALI reacts on this trigger as if it detected the movement with its built-in movement detection sensor. This means that the luminaires are controlled on movement detection in both the main and the extension area.

The extension movement sensor is ideal for areas, such as classrooms, that are slightly larger or differently shaped than the standard movement detection area of the OccuSwitch DALI. Up to two extension sensors may be connected to one OccuSwitch DALI.

NOTE

The extension movement sensor only extends the movement detection range of the OccuSwitch DALI. In some cases it is better to use multiple OccuSwitch DALI, instead of extending the detection range of one. For criteria on this, see Section 3.2.1.

2.2. Luminaire control

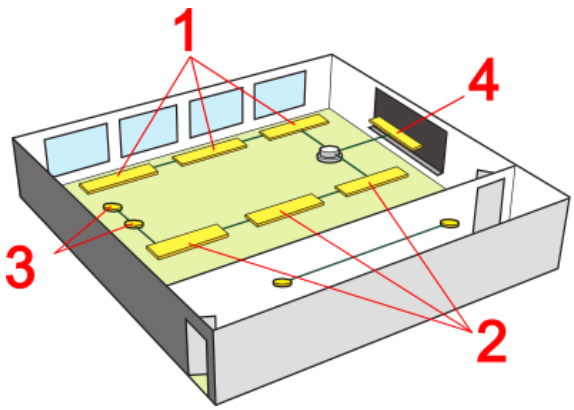
2.2.1. Group assignments

The OccuSwitch DALI can address four different groups of luminaires, by using four DALI groups. The following table shows the groups in which the luminaires can be used.

Table 7: Infrared channels available

DALI slave group	Default function	Description of default function
DALI group 1	Window luminaires	Auto on/auto off, automatic light level regulation for window side.
DALI group 2	Corridor luminaires	Auto on/auto off, automatic light level regulation for corridor side.
DALI group 3	Additional presence luminaires	Auto on/auto off, no automatic light level regulation.
DALI group 4	Additional absence luminaires	Manual on/auto off, no automatic light level regulation.

The following figure shows an application where all groups are in use:



For assigning luminaires to these DALI groups, see Section 4.2.3.

The window and corridor side speak for itself, but the additional groups are not so obvious.

Additional presence (group 3) is mainly used for luminaires in the area that do not have a window or corridor function nor daylight regulation and might be changed separately from the main lights. Typical examples are wall washers, task lighting, etc.

Additional absence (group 4) is used for additional luminaires with a specific function. The most common function is board lighting (for schools and meeting rooms).

The OSD will accept luminaires with ballasts that have already a DALI group address programmed. Please be aware that you need to program all ballast during the DALI commissioning, it is not possible to assign a single luminaire and leave the rest as it is.

Automatic control

This section shows how the automatic control of the OccuSwitch DALI is based on occupancy and daylight regulation.

2.2.2. Occupancy

The OccuSwitch DALI can automatically switch lights ON when the area is occupied and switched them OFF when the area is vacated. After the area is left unoccupied for a set time period, the lights will either switch OFF automatically or first dim to a background level for a set time period.

On some occasions when there is very little movement, the standard delay time of OccuSwitch DALI might be too short. If movement is detected during the turn-off fade (this takes 10 seconds) the lights will return to their “ON” value and the delay time is automatically increased by 10 minutes (Smart Timer).

Movement sensor

The movement sensor is a PIR (Passive Infra Red) sensor that detects occupancy in an area. When installed in a typical office ceiling at 3-metre height (between 2.5 and 3.5 meter), it is sensitive for small movements within a range of 4 by 5 meters and to large movements within a range of 8 by 6 meters.

The PIR sensor reacts on movement by means of a temperature difference such as the human body temperature versus its surrounding temperature. A car that just starts its engine is not seen by the PIR, nor does it see people sitting within the car or a forklift truck. Therefore it is recommended not to use the OccuSwitch DALI system in outdoor, parking or industrial applications.

The movement detection range can be extended with an extension movement sensor, which has the same viewing specifications as the standard sensor.

NOTE
It is possible to limit the detection area of the movement sensor with a retractable shield.

2.2.3. Daylight regulation

The OccuSwitch DALI has an automatic daylight regulation with a dynamic offset for the window and corridor rows. Daylight regulation helps to keep a constant light level at all situations.

Daylight sensor

The daylight sensor reads the actual average luminance. The intensity of the luminance depends on the amount of artificial and / or natural light in the room as well as on how well this light is reflected towards the ceiling. The light reflection depends highly on the colors and materials chosen to furnish the office.

For more information on this sensor, see section “Light sensing” on page 24.

For calibrating the daylight sensor, see Section 4.2.4.

NOTE
In case problems occur, it is possible to limit the detection area of the daylight sensor with an additional shield. Please contact your local Philips representative.

Dynamic offset control for window / corridor

Since the window area receives more daylight than the corridor area, window and corridor luminaires are controlled separately. Depending on the amount of daylight entering the room, the output of both window and corridor luminaire rows are dimmed to a minimum level with a difference of 30% between the window and corridor side.

When both window and corridor rows have been dimmed to the minimum level for more than 15 minutes, the window row will be turned off to ensure maximum energy saving. The corridor side, however, will by default only dim to the minimum level, hence indicating to the user that the lighting is operational.

NOTE: This default can be overridden, in order to turn the corridor row off as well. For this special case, please contact your local Philips representative for details.

In the daylight override function, the lights will switch on when someone enters the room even when there is sufficient natural daylight available.

Figure 5 shows the dynamic behavior (offset) of the window and corridor row luminaires.

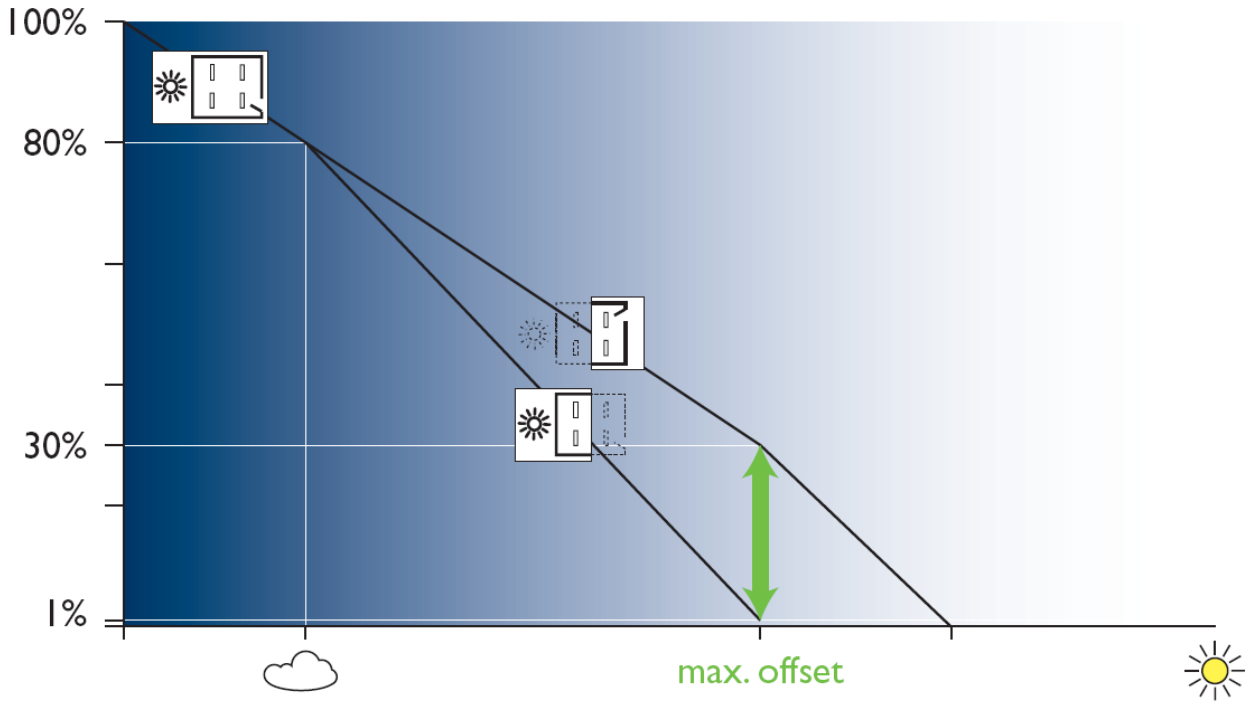


Figure 5: Dynamic offset between window and corridor

2.3. Local manual control

The OccuSwitch DALI can be manually controlled using IR remotes, Enocean® and (with the LCU2070 PBU) normal pushbutton switches. Manual control is required for switching on the system in semi-automatic (manual on / automatic off) applications and for manually overriding the OccuSwitch DALI automatic control functions.

CAUTION
Take into consideration that manual control will always stop the daylight regulation.
The OccuSwitch DALI will start regulating again according when:

- Occupancy after the area was unoccupied (the lights switch off).
- Give a general switch on command (shortly press channel 1 on the remote or switch)
- Select Preset 1 on the OccuSwitch DALI (see section 2.3.7 Presets)

2.3.1. Manual control channels

The manual control can be done on 5 different channels, as shown in the following table:

Table 8: Manual control channels available

Control channel	DALI slave group	Description
Channel 1 (Default)	DALI groups 1, 2 and 3	Window, corridor and additional presence luminaires. When manually setting the light level, the corridor and additional presence luminaires will follow the window channel with an offset. Daylight override may cause window luminaires to stay off.
Channel 2	DALI group 1	Window luminaires
Channel 3	DALI group 2	Corridor luminaires
Channel 4	DALI group 3	Extra auto on
Channel 5	DALI group 4	Additional absence luminaires

By default the remote controls are set to only channel 1, simultaneously controlling window, corridor and additional presence luminaires. Only the IRT8050 can be configured to use other channels. For setting the infrared channels, see the datasheet of the remote.

2.3.2. Manual control with the IRT8050

The IRT8050 can be used in many configurations. The table below shows the most common configurations. The default settings of the IRT8050 are listed on the first line. For more information please check the datasheet of this device.

Table 9: Manual control functions with the IRT8050

Normal application function	Switch		**OSD Channel**				**8050 DIP**							**IRT 8050 function**	
		Dim	1	2	3	4	4	5	6	7	8				
General on/off dim	•	•	•	•	•							Ch 1 Off / Down	Ch 1 On / Up
Window side	•	•	•				•					Ch 2 Off / Down	Ch 2 On / Up
Corridor side	•	•		•				•				Ch 3 Off / Down	Ch 3 On / Up
Additional lighting	•	•			•		•	•				Ch 4 Off / Down	Ch 4 On / Up
Board lighting	•	•				•			•			Ch 5 Off / Down	Ch 5 On / Up
General on/off	•		•	•	•	•	•		•			All Off	Preset 1
General lighting + window control	•	•	•	•	•			•		•		Ch 1 On & Ch 1 Off	Ch 2 On & Ch 2 Off
Window/corridor control	•	•	•	•			•	•		•		Ch 2 On & Ch 2 Off	Ch 3 On & Ch 3 Off
General on/off/dim + board lighting	•	•	•	•	•	•		•	•	•		Ch 5 On & Ch 5 Off	Ch 1 On & Ch 1 Off

The combined function off/dim down and on/dim up can be operated with a short press (switch on or off) or by a long press, enabling the dimming function.

2.3.3. Manual control with the IRT8010

The IRT8010 is a single channel remote control.
Please note that the IRT8010 cannot address the second additional channel (DALI group 4).

The IRT8010 is a two-key remote control, suitable for switching on / off and dimming up / down single lighting control circuits (one channel control). It enables manual override of the OccuSwitch DALI automatic control system. The control can only handle IR channel 1, so in combination with the OSD general on/off and dim commands can be send. Suitable for schools / classrooms and meeting rooms. When place in the LRH810 holder it can also function as 'wall switch'.

Note you cannot change the function of this device, only the IR group it belongs to.

The infrared group address can be set with a rotary switch within the unit itself.

Use (section 2.3.1)	**Error! Reference source not ound. (**Error! Reference source not found.**)**	**Error! Reference source not ound. (**Error! Reference source not found.**)**
Manual control channel 1 (window, corridor and additional presence)	Short press: lights off Long press: lights dim down	Short press: lights on Long press: lights dim up

2.3.4. Infrared manual control groups

The OccuSwitch DALI contains an infrared receiver that enables the manual (remote) control of the system. For the maximum distances of the controls to the receiver, see the datasheet of the controls.

Infrared group addressing makes it possible to control individual light groups in open plan offices without affecting the light level of neighbors. The OccuSwitch DALI can be set to one of seven available groups (group A, B, C, D, E, F or G).

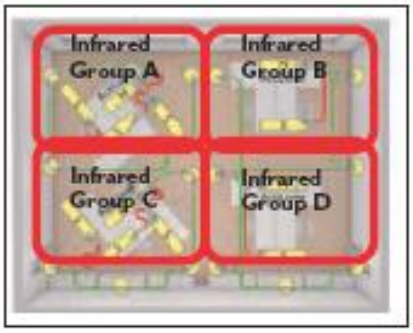


Figure 6: Infrared groups

The default infrared group for the OccuSwitch DALI and the remote controls is group A. The OccuSwitch DALI and the remote control must always operate in the same group.

Setting the infrared group of the OccuSwitch DALI is done with the OmniProg, see Section 4.2.11.

2.3.5. Manual control with Enocean® switches.

REMARK: This section only applies to the EnOcean® enabled versions of the OccuSwitch DALI (LRM2071, LRM2081 and LRM2091).

It is not possible to indicate the maximum distance between an Enocean® switch and the OSD, since switches are not supplied with the OSD. In general (without any guarantee) a distance of 10...15 meter can be bridged. Walls, especially with reinforced concrete will strongly shorten this range.

EnOcean® technology provides a wireless and battery-less mechanism to transmit rocker commands to one or more receivers. In the OccuSwitch DALI this technology enables manual override of the automatic control system. The switches are suitable for 1-channel or 2-channel semi-automatic applications (schools / classrooms and meeting rooms with light scene options).

The OccuSwitch DALI supports two types of EnOcean controls. The single rocker switch is suitable for switching and dimming single lighting control circuits (one channel control). The dual rocker switch is suitable for switching and dimming dual lighting control circuits (two channel control).

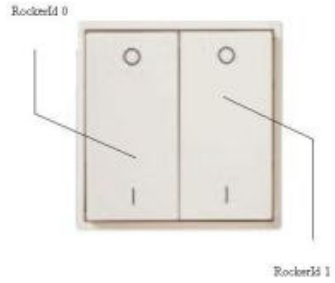
For binding an EnOcean® switch to the OccuSwitch DALI, see Section 4.1.3.

Single rocker

	Manual control channel 1: window, corridor and additional presence [1]
"O" side	Short press: lights off Long press: lights dim down
"I" side	Short press: lights on Long press: lights dim up

[1] For the definition of channels, see section 2.3.1.

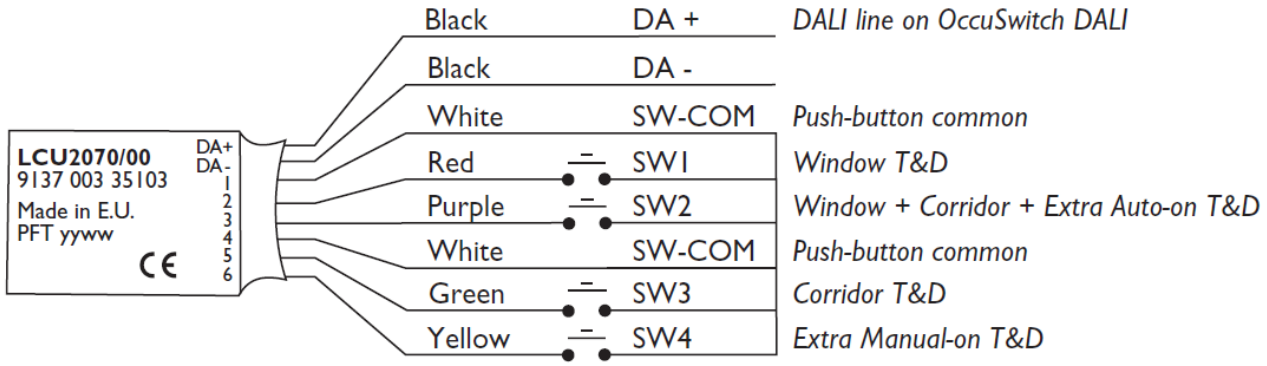
Dual rocker



Use mode [2]	Left (A)	Right (B)
Mode 1	Channel 1: window, corridor and additional presence	Channel 5: additional absence
Mode 2	Channel 2: window	Channel 3: corridor
"O" side	Short press: lights off Long press: lights dim down	Short press: lights off Long press: lights dim down
"I" side	Short press: lights on Long press: lights dim up	Short press: lights on Long press: lights dim up

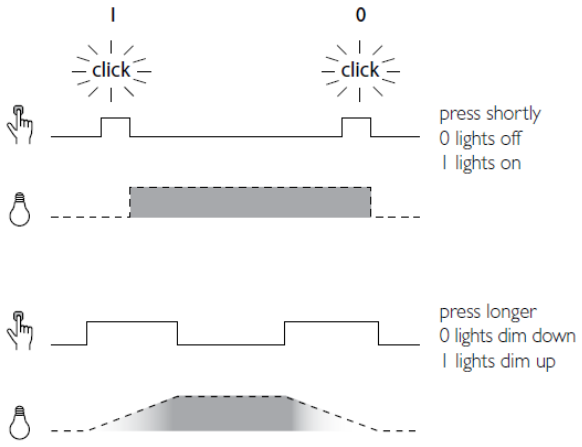
2.3.6. Manual control with standard switches and the LCU2070

The LCU2070 push button interface makes it possible to connect any type of push button to the OSD system. The connection is simple, connect the interface (with the black wires) to the DALI line, and connect 1 till 4 switches to the unit. Each switch has a specific function. This function is fixed.



Note; extra auto-on = additional presence luminaires & extra manual-on = additional absence luminaires

The switches work with a Touch & Dim function that also can be found in many ballasts. The function is show on the right hand side.



[2] For binding a switch to one of these modes, see section 4.1.3.

2.3.7. Presets (basic & advanced versions)

Presets are used to recall pre-programmed light scenes. Selecting presets is only possible with the IRT8050 or IRT8080 transmitters. There are 4 presets available, as shown in the following table:

	Preset 1	**Preset 2**	**Preset 3**	**Preset 4**
Window row	Automatic	100%	50%	10%
Corridor row	Automatic	100%	50%	10%
Extra Auto-on row	100%	100%	50%	10%
Extra Manual-on row	Unchanged	100%	50%	10%

Preset 1 is fully automated mode of the OccuSwitch DALI. When selecting this mode, the automatic daylight regulation starts working, based on the calibrated maximum light level.

Preset 2 to 4 use the predefined light level as shown in the table. When the OccuSwitch DALI is set to one of these presets, all luminaires react in the same way. For example, setting the OccuSwitch DALI to preset 3 causes all luminaires go to 50% of the maximum light level.

NOTE: In the OccuSwitch DALI Basic and OccuSwitch DALI Advanced systems the values for the presets cannot be changed.

Selection of preset 2,3 or 4 will stop daylight depending regulation. All manual control will restart the occupancy timer.

2.3.8. Presets (BMS version)

Presets (selected by the user via a remote control (IRT8050 or IRT8080) and scenes (selected and programmed via de (BMS) DALI interface) overlap each other.

Preset 1 and Scene 1 are the same, as are 2,3 and 4. This means that a scene 2 command from the DALI interface will result in the same action as selecting preset 2 on a remote control.

Presets 2,3 and 4 cannot be changed via the IR interface (e.g. with a IRT8050), but CAN be changed via the DALI interface (select a value and load it into scene 2,3 or 4).

Preset 1 and scene 1 cannot be changed, this is the automated mode. It is possible to program scene 1 and if the scene setting is read back the original value will be reported. However the OSD will not use this value when recalled and go into automated mode instead.

The default values of the scenes and preset are shown in the table in the previous paragraph. Both preset and scene commands will reset the occupancy timer.

NOTE: Repeat the scene command if the lights need to switched on, even without somebody being present. The repeat time should be shorter than the selected occupancy timer.

2.3.9. Manual control of multiple OccuSwitch DALI

Sometimes it is required that two OSD units are manually controlled by one user interface.

Using IR remote controls

In general the IR remote controls will have a reach of 5...7 meter. So you can control a neighboring OSD as well, provided they use the same IR group.

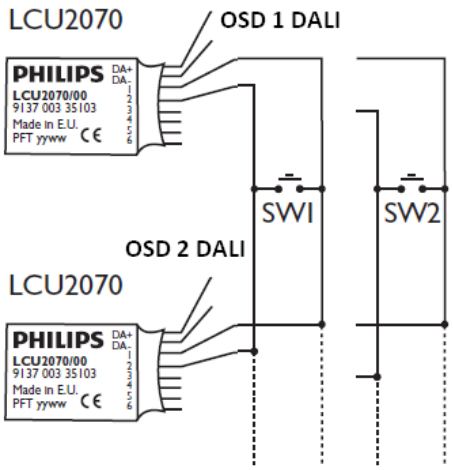
Using Enocean® switches

You can bind switches to several OSD units, without any problems, to control neighboring OSD as well.

Using standard switches and the Push Button Interface

You can connect a single switch to multiple push buttons units. You need a LCU2070 PBU per OSD unit you want to control.

The schematic on the right shows the general idea.



3. Application design

To design the OccuSwitch DALI in any application, the designer must:

1. Select the number of control areas to use and define the position of the sensors
2. Choose the OccuSwitch DALI type(s) to use: stand-alone, linked or controlled from a central building management system. Option to use with EnOcean.
3. Choose or design the mode that each OccuSwitch DALI needs to work in.

Each of these steps is explained in more detail in the subsections of this chapter.

The number of OccuSwitch DALI to be used in an application on one hand depends on the area that needs to be covered by the sensors and on the other hand on the number of output luminaires to control.

3.1.1. Luminaire output

The DALI output of the OccuSwitch DALI can be loaded with a maximum of 15 DALI ballasts or extension sensors.

As each luminaire is usually controlled by one ballast, the maximum area to be controlled by one OccuSwitch DALI is restricted to 15 ballasts. This number is reduced when using one or more extension sensors: each extension sensor counts for one DALI ballast. The maximum number of extension sensors per OccuSwitch DALI is 2: in this case the 13 luminaire ballasts can be controlled.

If the lighting requirements for an area require more than 15 luminaires, the area should be split in to sub areas. Each of these sub areas can then be controlled by a separate OccuSwitch DALI.

3.1.2. Use area

The OSD is detecting movement for occupancy and measuring light levels for daylight depending control
The detection area of the OccuSwitch DALI is defined by the detection limits of its movement detection sensor and its light sensor. To ensure a reliable working, the number of OccuSwitch DALI in the application must be defined with these detection fields in mind.

The detection area of the OccuSwitch DALI and the extension sensor depends on the height of the ceiling where it is installed. In this manual, an installation height between 2.5 and 3.5 meter is assumed.

NOTE: if you want to use the OccuSwitch DALI in an application with a ceiling height of less than 2.5 meters, the detection area is significantly smaller. Please contact your local Philips representative for the exact dimensions.

NOTE: use of the OccuSwitch DALI in an application with a ceiling height of more than 4 meters may cause in unreliable movement detection, and is therefore advised against.

Movement detection

At a ceiling height of 3 meter, the maximum movement detection area of both the OccuSwitch DALI and the extension sensor is 6 by 8 meter. However the useful area of the sensor is limited to 20 m².

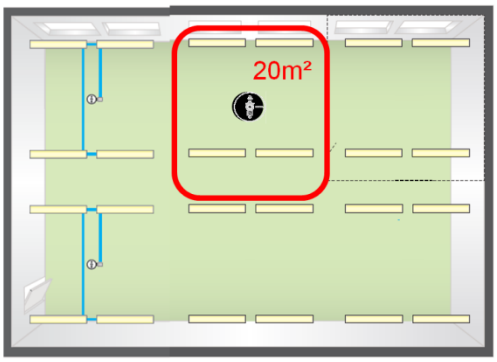


Figure 7: Movement detection range and design of OccuSwitch DALI

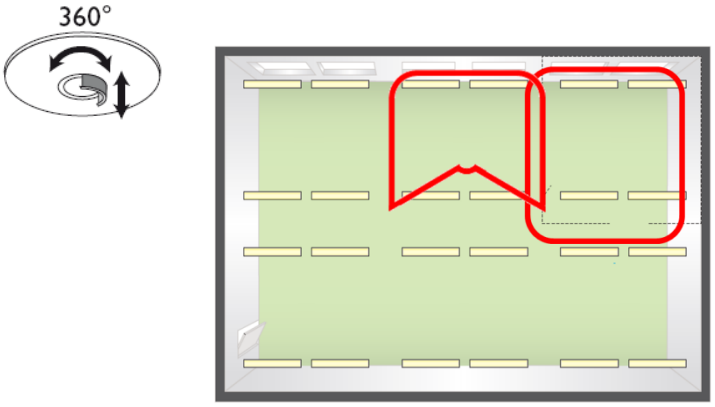


Figure 8: Shielding the movement detection range

When a part of the sensor's viewing area should not be used for movement detection, the area of movement detection can be partially reduced by the retractable view shield (see

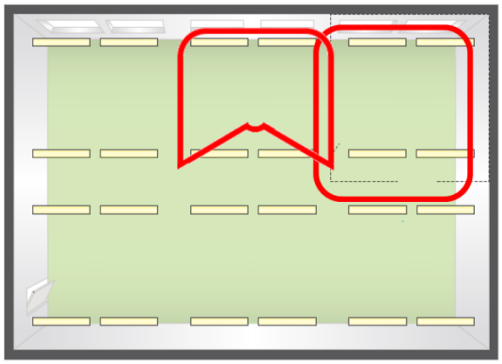


Figure 8).

For applications where little movement is made, like an office application, the number of movement detection sensors must be calculated by dividing the total area of the room in parts of 4 by 5 meter. In the center of each of these parts, one OccuSwitch DALI or extension sensor must be placed. For choosing whether to use multiple OccuSwitch DALI or to use one OccuSwitch DALI with extension sensors, see Section 3.2 "Selecting the OccuSwitch DALI type" on page 25.
For applications where larger movements are made, like a corridor or a central hall, the outer detection area can also be used, so the total area can be divided in parts of 6 by 8 meters.

NOTE: To ensure reliable movement detection, all of the applicable space must be covered by the detection area of either an OccuSwitch DALI or an extension sensor. Therefore, for calculating the rough number of OccuSwitch DALI or extension sensors, the resulting number of dividing the total area by the sensor detection area must be rounded up towards the next whole number.

Tip: When placing the designed position of the OccuSwitch DALI or extension sensor in an installation drawing, note the direction of the detection area. The OccuSwitch DALI or extension sensor must be placed according to this direction. To do this alignment, the "Philips" word mark and the sensor line-up can be used.

Light sensing

The OccuSwitch should be placed in such a way that the sensor does not “see” any outside lights, for instance from windowsills, parked cars, etc. etc.

For this the sensor should be placed as shown in figure 9.

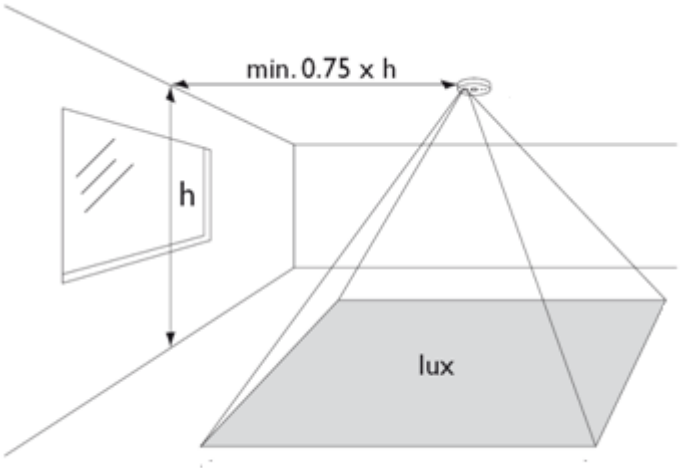


Figure 9: Light detection range and position

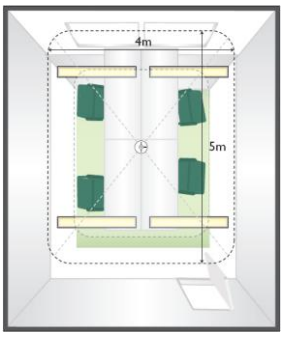
3.2. Selecting the OccuSwitch DALI type

When the detection areas are known, you should define which sensor to use for each area: an OccuSwitch DALI Basic, OccuSwitch DALI Advanced, OccuSwitch DALI BMS, or an extension sensor. This decision should be based on the grouping of the detection areas, and the amount of communication needed between these groups. For all OccuSwitch DALI sensors also choose if you want to use this OccuSwitch DALI with EnOcean switches.

3.2.1. OccuSwitch DALI or extension sensor

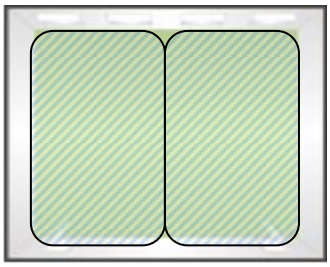
First step is to select for each detection area between using an OccuSwitch DALI or an extension sensor. To this purpose you must define application areas, where all the luminaires must be dimmed as a group. An application area may contain one or more detection areas, but can be controlled by one single OccuSwitch DALI. If the application area contains more than one detection field, the extra fields will be monitored by extension sensors connected to the same OccuSwitch DALI. Take care however that the total number of luminaires and extension sensors per OccuSwitch DALI does not exceed the maximum allowed load.

In the simplest case, a room is so small that it is totally covered by one detection area. In this case there is only one application area, which consists of only one detection area. This application area needs one OccuSwitch DALI without any extension sensors.

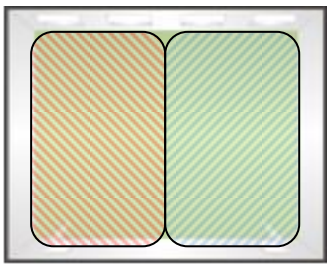


In a larger room, multiple detection or control areas are needed. These detection areas must be grouped into application areas:

- If the light levels all over the room must be controlled as a whole, the detection areas in the room are grouped as only one application area, which can be controlled by one OccuSwitch DALI. The additional detection area is covered by using an extension sensor.



- If the luminaires in the different detection areas may be dimmed separately, each detection area can be defined as a application area. For each application area, one OccuSwitch DALI is used.

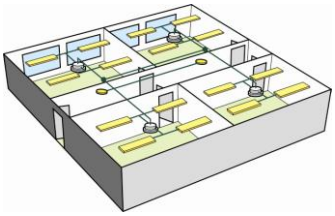


If communication between OccuSwitch DALI is used (see next section), it is still possible and fairly easy to make separate application areas work as one regarding movement detection. Splitting an application area is much harder, as it needs replacement of an extension sensor by an OccuSwitch DALI, and a split in the DALI connection. It is therefore recommended to carefully choose between an extension sensor and an OccuSwitch DALI.

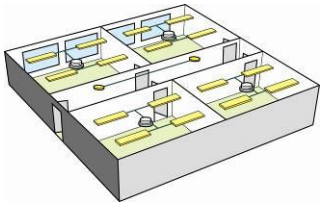
3.2.2. Type of OccuSwitch DALI

After defining for each area whether an OccuSwitch DALI or an extension sensor is used, you can select for each OccuSwitch DALI which model to use, depending on the need for communication with any neighboring application areas and/or a building automation system:

- If the OccuSwitch DALI Basic is used, no communication will take place with neighboring application areas or a building automation system. It will operate stand-alone, dimming and switching the light according to its own measurements and that of any connected extension sensors.

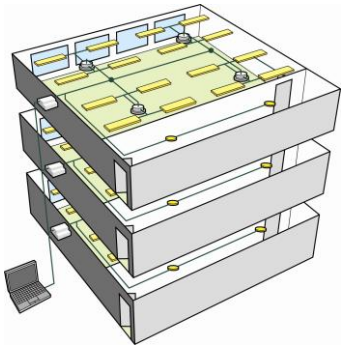


- If the OccuSwitch DALI Advanced is used, OccuSwitch DALI can be connected to each other via a “Parallel link”. Each OccuSwitch DALI regulates the light level according to its own measurements, but in addition it will use the parallel link connection to report and react on movement detection. If one of the connected OccuSwitch DALI detects movement, it reports this on the parallel link. Each of the other OccuSwitch DALI on the link are set to either:
  - switch the local luminaires as if movement was detected locally, or
  - switch the local luminaires on, at a pre-programmed background lighting level.



- If the OccuSwitch DALI BMS is used, the OccuSwitch DALI will communicate with a DALI-capable building management system

  NOTE: In a DALI network it is not possible for OccuSwitch DALI devices to exchange data directly with each other. All communication is going via the DALI master.



As the last step for selecting the OccuSwitch DALI type, it should be defined if the OccuSwitch DALI must be equipped with EnOcean capability. The EnOcean capability is needed if the OccuSwitch DALI must be locally controlled with EnOcean switches.

3.3. Selecting the OccuSwitch DALI mode

Once the placement of the OccuSwitch DALI(es) is selected (as explained in Section 3.2), it has to be specified how the OccuSwitch DALI must react on its movement detection, light sensor, and optional parallel link. The OccuSwitch DALI has 10 application modes (9 predefined and one customizable) that define how the connected luminaires are controlled.

Table 10 (on next page) shows the application modes and their parameters. For an explanation of the parameters in this table, see below:

- **Auto switch-ON**: the lights will automatically switch on when someone enters the area.

- **Auto switch-OFF**: the lights will automatically switch off when the area is vacated (and no parallel link activity has taken place) for the duration given with the potentiometer.
- **Smart timer**: when the lights automatically switch off, and a movement is detected during this fade down, the OccuSwitch DALI temporarily extends the movement detection period (as given with the potentiometer). The smart timer value shown in the table defines with how many minutes the movement detection period will be extended.
- **Background period**: the OccuSwitch DALI will keep its luminaires on background level for this many minutes, before switching the luminaires off. See also Figure 10 below.
- **Activity on parallel link acts as**: defines what action the OccuSwitch DALI will take an event occurs on its parallel link while its luminaires are off. Two options exist: local occupancy means that the OccuSwitch DALI will act as if local occupancy is detected; background lighting means that the OccuSwitch DALI will switch all its luminaires on at the background level.
- **Daylight dependent regulation**: luminaires will be dimmed depending on the measured light level.
- **Daylight switching on window/corridor side**: when sufficient daylight is available the luminaires (of the given side) will be switched off.
- **Daylight override**: when the OccuSwitch DALI detects movement and sufficient daylight is available, the luminaires for which daylight switching is enabled will not switch on.

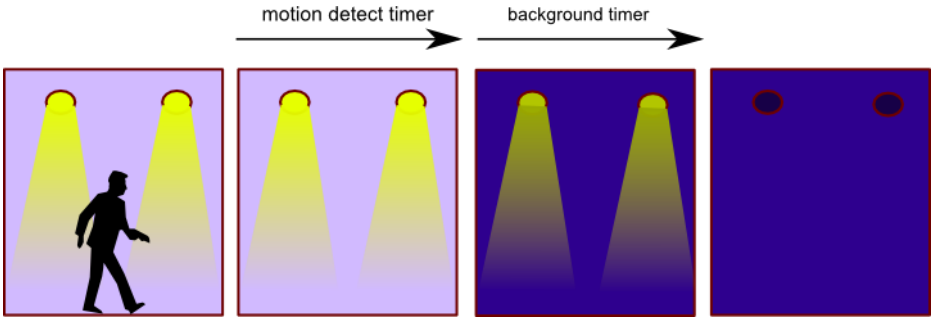


Figure 10: Movement detection phases

Selecting a mode for an OccuSwitch DALI can be done in two ways:

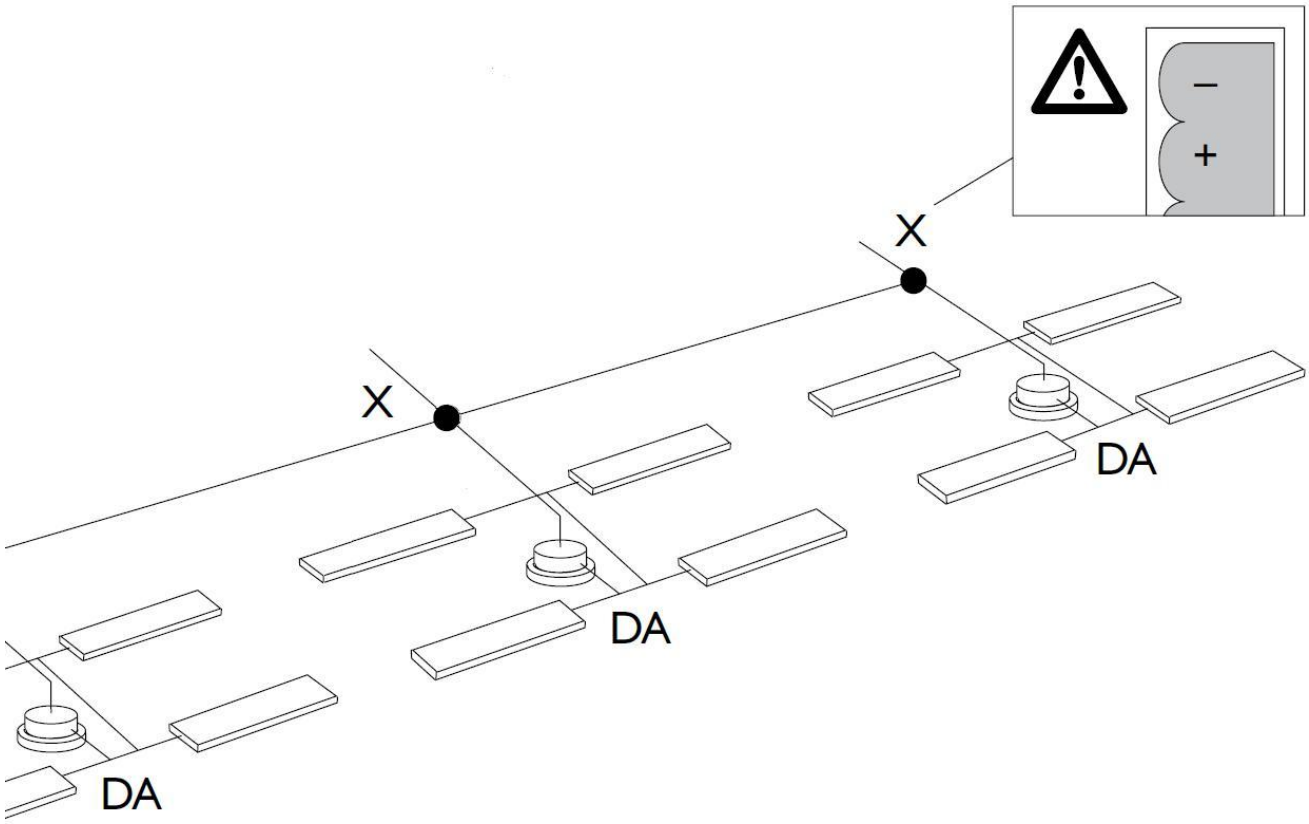
- For an easy selection, look up the mode based on the application that the OccuSwitch DALI is used in. To select the mode, find the application type in the table.

  For example: when using an OccuSwitch DALI Advanced in an open plan office, with parallel link connected, the OccuSwitch DALI can be placed in mode 9: “Open plan office with parallel link”.
- For a more advanced selection, select the mode based on the parameters.

  If the required set of parameters is not listed as one of the modes 1-9, you may select to use a custom application mode, which is mode 10. For more information on using this custom mode, please contact your supplier.

3.3.1. Parallel operation and open plan mode (mode 9) LRM208x only

The LRM208x can be used in parallel mode. With this feature different (up to 22) units can be connected in parallel as the figure below shows.



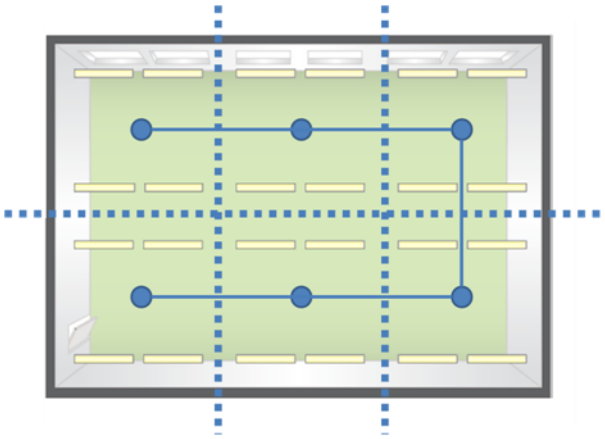
In all modes except mode 9 parallel operation means that occupancy is truly handled as parallel. In other words if one sensor picks up occupancy, all devices will react as if their own sensor was triggered.

Parallel operation does not mean that the units act in the same way!

Only the occupancy trigger is shared. The units will switch off in different ways if timers are set in different ways. For this the OSD has a digital potentiometer for the delay timer. If set around 15 minutes, the unit will make the time exactly 15 minutes. So if several units are used in the same area, please set the timer at almost the same position. When the complete area is now vacated all units will switch off (or dim to background level) within 3 seconds.

Mode 9 is a special mode for this parallel operation. The OSD will now make a difference if it detects occupancy by itself or when it gets a message from its neighbor. In the first case lights will switch on to nominal level, in the second case lights will switch on and dim to background level.

Let's look at an example. The office on the right exists of 6 office grids with an OSD in each grid.



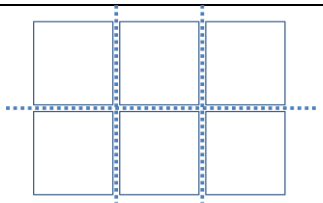
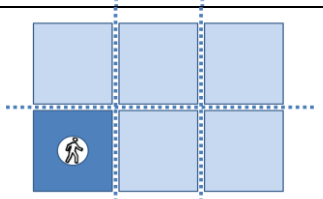
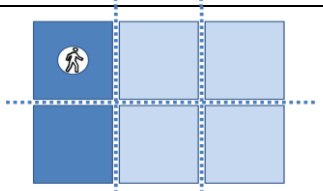
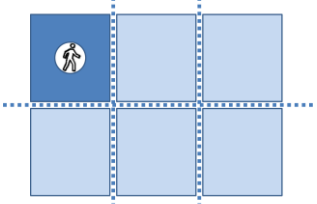
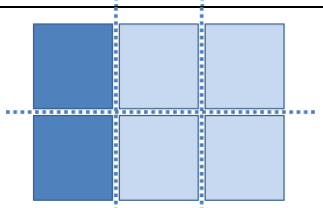
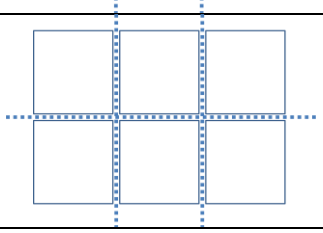
At starts the area is vacated for some time and all lights are off.	
If somebody enters the area all lights will switch on, but at the location where the person is present lights will be on full, in all other area's lights will switch on background level.	
If the person moves to another sections, light sin that grid will dim up to nominal level. In the vacated area light swill stay on at this level, until the timer expires.	
After the timer in the first grid expired lights in that section will dim to background level.	
If the person leaves the room all together lights in grids on his/her way out will be again at nominal level. This will remain until the timers expire.	
If no occupancy is detected in either of the OSD units and all timers have expired, all lights will switch off.	

Table 10: Mode setting overview

Mode	Application	Occupancy related					Daylight level related			
		Auto switch-ON	Auto switch-OFF	Smart timer (minutes)	Activity on parallel link acts as	Background period (minutes)	Daylight dependent regulation	Daylight switching on window side	Daylight switching on corridor side	Daylight override
1	Cell office	Enabled	Enabled	10	Local occupancy	0	Enabled	Enabled	Disabled	Enabled
2	Open plan office	Enabled	Enabled	10	Local occupancy	120	Enabled	Enabled	Disabled	Enabled
3	Class room	Disabled	Enabled	10	Local occupancy	0	Enabled	Enabled	Enabled	Disabled
4	Cell office without movement detection	Disabled	Disabled	N.A.	N.A.	0	Enabled	Enabled	Disabled	Disabled
5	Open plan office without movement detection	Disabled	Disabled	N.A.	N.A.	0	Enabled	Enabled	Disabled	Disabled
6	Corridor	Enabled	Enabled	10	Local occupancy	60	Enabled	Enabled	Enabled	Enabled
7	Toilets	Enabled	Enabled	0	Local occupancy	15 *)	Disabled	Disabled	Disabled	Disabled
8	Meeting room	Disabled	Enabled	10	Local occupancy	0	Enabled	Enabled	Disabled	Disabled
9	Open plan office with parallel link	Enabled	Enabled	10	Background lighting	0	Enabled	Enabled	Disabled	Enabled
10	Custom									

*) Only on portal luminaires (channel 1)

4. Commissioning

The physical installation of the OccuSwitch DALI system is described in the installation instructions and data sheet. These sheets are added to the printed version of this manual. Otherwise please look at the internet pages on the OSD to get the latest version.

Once installed, the OccuSwitch DALI system is ready to be used in its default mode. However, to assign the connected luminaires to the correct groups and to set other settings according to the design, the OccuSwitch DALI system needs to be commissioned. The sections in this chapter show how this is done.

The commissioning of the OccuSwitch DALI is done using the following equipment:

- Service pushbutton on the OccuSwitch DALI
- Potentiometer on the OccuSwitch DALI
- IRT8097/00 (OmniProg Easy) or IRT8099/10 (OmniProg) infrared programmer
- DALI master system (BMS version only)

The table below shows what functions can be done with each commissioning tool. Each function (except switching on/off) is described in the subsequent sections of this chapter.

Tool	Programming function
Service button	• **Set reference light level to current level** • **Set reference light level by auto-calibration** • **Bind EnOcean switch (EnOcean enabled OccuSwitch DALI only)**
Potentiometer	• **Set value of delay timer**
OmniProg Easy (IRT8097/00)	• **Set reference light level to current level** • **Check parallel link (witnessing test)** • **Enable 100-hour burn-in mode** • **Assign luminaires to group 1 (Window) or group 2 (Corridor)** • Switch luminaires on/off
OmniProg (IRT8099/10)	• **Set reference light level to current level** • **Check parallel link (witnessing test)** • **Assign luminaires to any group** • **Set light level of background lighting** • **Request current application mode** • **Set application mode** • **Set power-up state** • **Set IR group address** • **Reset to factory settings** • Switch luminaires on/off Note no function for 100h burn in

4.1. Configure controls and switches

This section describes how to set the infrared group and channel settings for Infrared remote controls IRT8010 and IRT8050 and how to bind an EnOcean® switch to an OccuSwitch DALI.

4.1.1. IRT8010

In order to avoid that all lighting circuits in one room are switched unintentionally, the transmitters present in one room and their respective receivers can be given an individual infrared group address.

The group address of the transmitter must match the group address of the OccuSwitch DALI. The group address of the transmitter can be changed by using the rotary switch in the battery compartment, see Figure 11.

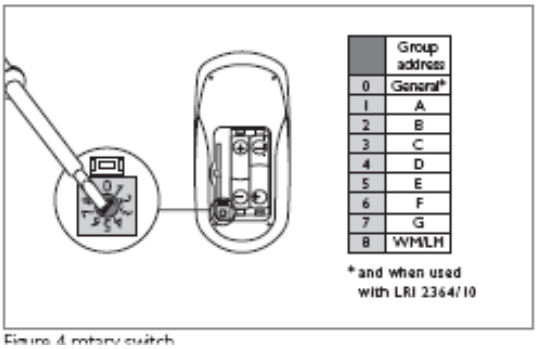


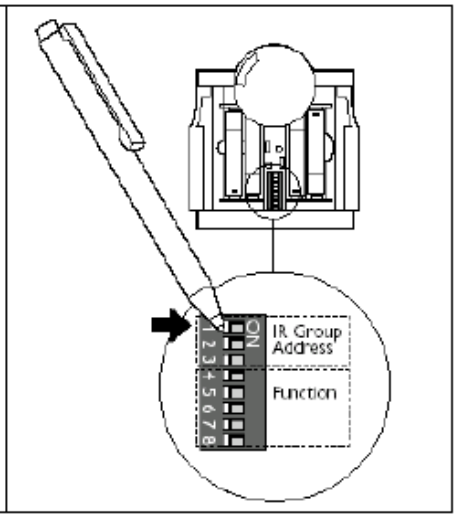
Figure 11: IRT8010 settings

4.1.2. IRT8050

In order to avoid that all lighting circuits in one room are switched unintentionally, the transmitters present in one room and their respective receivers can be given a different infrared group address.

The group address of the transmitter must match the group address of the OccuSwitch DALI. The group address of the transmitter can be changed by dipswitches, see Figure 12.

Dip switch position 1	2	3	groups address
			A
•			B
	•		C
•	•		D
		•	E
•		•	F
	•	•	G
•	•	•	General



DIP Switch Position 4	5	6	7	8	LEFT KEY Function	RIGHT KEY Function
					Ch 1 Off / Down	Ch 1 On / Up
•					Ch 2 Off / Down	Ch 2 On / Up
	•				Ch 3 Off / Down	Ch 3 On / Up
•	•				Ch 4 Off / Down	Ch 4 On / Up
		•			Ch 5 Off / Down	Ch 5 On / Up
•		•			All Off	Preset 1
	•	•			All Off	Preset 2
•	•	•			All Off	Preset 3
			•		All Off	Preset 4
•			•		Blinds Down	Blinds Up
	•		•		Ch 1 On ⇔ Ch 1 Off	Ch 2 On ⇔ Ch 2 Off
•	•		•		Ch 2 On ⇔ Ch 2 Off	Ch 3 On ⇔ Ch 3 Off
		•	•		Ch 3 On ⇔ Ch 3 Off	Ch 4 On ⇔ Ch 4 Off
•		•	•		Ch 4 On ⇔ Ch 4 Off	Ch 5 On ⇔ Ch 5 Off
	•	•	•		Ch 5 On ⇔ Ch 5 Off	Ch 1 On ⇔ Ch 1 Off
•	•	•	•		All Off	Preset 1 ⇔ Preset 2
				•	All Off	Preset 1 ⇔ Preset 3
•				•	All Off	Preset 1 ⇔ Preset 4
	•			•	All Off	Preset 4 ⇔ Preset 3
•	•			•	All Off	Preset 4 ⇔ Preset 2
		•		•	All Off	Preset 4 ⇔ Preset 1

Figure 12: IRT8050 settings

4.1.3. EnOcean® switches

This section describes how to bind a single or a dual rocker EnOcean® switch to the OccuSwitch DALI.

Single rocker EnOcean® switch

1. Press the push button on the OccuSwitch DALI housing for less than 3 seconds.
   The OccuSwitch DALI goes to the EnOcean Learn Mode.
2. Within 10 seconds, press the push button on the OccuSwitch DALI housing for at least 3 seconds.
   For four seconds, the LEDs on the OccuSwitch DALI blink in a fast cycle of long green – short yellow. The OccuSwitch DALI is now busy.
   After this four seconds, the LED on the OccuSwitch DALI blinks this same cycle (long green – short yellow) slower. This shows that the OccuSwitch DALI is ready to receive EnOcean commands.
3. Press both switches A and B of the dual rocker switch (either “I” or “O”).
4. The OccuSwitch DALI simultaneously flashes the window, corridor and extra auto-on rows once to indicate that it received the command.
   For four seconds, the LEDs on the OccuSwitch DALI blink in a fast cycle of long green – short yellow. The OccuSwitch DALI is now processing the EnOcean command.
   After this four seconds, the LED on the OccuSwitch DALI blinks this same cycle (long green – short yellow) slower. This shows that the OccuSwitch DALI is ready to receive EnOcean commands.
5. To bind up to three more switches to this OccuSwitch DALI, repeat step 2-4 for every switch within 30 seconds between each other.
6. Press the push button on the OccuSwitch DALI housing within 30 seconds after the last rocker switch was pressed for less than 3 seconds.
   The OccuSwitch DALI goes back to the normal mode and the LED indicators stop blinking.

NOTE

When the maximum supported amount of rocker switches have been bound, the OccuSwitch DALI automatically leaves the EnOcean Learn mode and the LED will stop its visual indication.

Dual rocker EnOcean® switch

1. Press the push button on the OccuSwitch DALI housing for less than 3 seconds.
   The OccuSwitch DALI goes to the EnOcean Learn Mode.
2. Within 10 seconds, press the push button on the OccuSwitch DALI housing for at least 3 seconds.
   The LED on the OccuSwitch DALI blinks in a cycle of green, green, green, yellow.
3. Press one rocker of the switch that you want to bind. To bind the switch in binding mode 1 (channel 1 and 5, see section **Error! Reference source not found.**), press the “O” side. To bind the witch to mode 2 (channel 2 and 3, see section **Error! Reference source not found.**), press the “I” side.
4. The OccuSwitch DALI simultaneously flashes the window, corridor and extra auto-on rows once to indicate that it received the command.
5. To bind up to three more switches to this OccuSwitch DALI, repeat step 2-4 for every switch within 30 seconds between each other.
6. Press the push button on the OccuSwitch DALI housing within 30 seconds after the last rocker switch was pressed for less than 3 seconds.
   The OccuSwitch DALI goes back to the normal mode and the LED indicators stop blinking.

NOTE

When the maximum supported amount of rocker switches have been bound, the OccuSwitch DALI automatically leaves the EnOcean Learn mode and the LED will stop its visual indication.

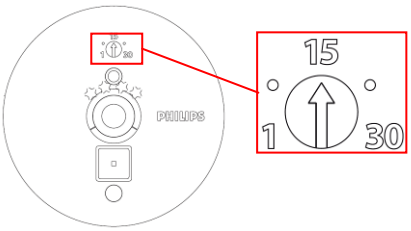
4.2. Configure the OccuSwitch DALI

4.2.1. Checks

Make sure that the OccuSwitch DALI system has been installed correctly, by checking the LEDs and luminaires function (see Section xxx (Basic manual)).

4.2.2. Motion detect timer

The motion detect timer defines the time after which the lights will be turned to the background light level, or be turned off.



1. Turn the potentiometer to the desired value.
   As shown in the figure, the potentiometer range is not linear, but divided in a number of possible settings.

4.2.3. Assigning luminaires to DALI groups

IRT8097/00

IRT8099/10

1. Press **DALI address** to start the allocation process.
   The luminaires flash indicating that the OccuSwitch DALI has received the command.
   One by one all luminaires dim.
   When this process stops one luminaire starts to blink.
2. Select the DALI group this luminaire should be in (**Window/Corridor** on IRT8097, **1**...**4** on IRT8099).
   Directly after sending the channel number another luminaire starts to blink.
3. Repeat step 2 for all other luminaires.
   When all luminaires are assigned to a channel, all luminaires blink once, and the OccuSwitch DALI returns to normal operation.

NOTE

At all actions, stay close to the OccuSwitch DALI and point the remote control towards the sensor.

NOTE

The procedure above can be aborted at any moment by pressing **DALI address** again. Aborting the assign process resets all luminaires and/or ballasts to un-commissioned state. See section 2.1 for the behavior of the OccuSwitch DALI in uncommissioned mode.

NOTE
If the infrared channels are not assigned correctly, you can either reset the system to un-commissioned mode and/or re-program the luminaires or reset the complete OccuSwitch DALI to factory settings (see Section 4.3).

4.2.4. Calibration of the required light level

The OccuSwitch DALI will already function quite well in most applications since the factory settings are designed for the common offices. However calibration is required to reach optimal cost savings, and to be certain that the minimal required light levels are met.

The OccuSwitch DALI should be calibrated after:

- The furniture is in placed in the room.
- Major changes have been made to the room or furniture placement.

Before calibration

- Make certain you have the right tools (OmniProg, luxmeter)
- Make certain that the daylight contribution to the rooms light level is less than 70%.
  You can easily check this. The level you measure with the lights switched off should be below 70% of the required light level.
  Closing the curtains or sun blinds can already take care of this
- Make certain that the amount of daylight is not fluctuating during the measurement. A partly clouded sky with fast moving clouds can hamper the right measurements.

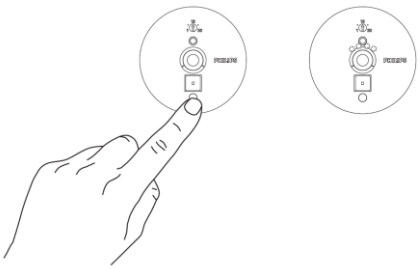
While this section describes several methods to calibrate the system, it is recommended to use the IRT8097/00 or IRT8099/10 for system calibration.

Manual calibration with the push button and current light level

The following tools are required for this method:

• Remote control unit (IR or EnOcean)

• Stepladder for operating the service button.



1. Change the light level to the correct light value, using any available manual control (Infrared transmitter, EnOcean buttons).
2. Press the push button on the OccuSwitch DALI for at least 3 seconds.
   The LED blinks in a cycle of “long yellow - short green” to indicate that calibration is about to start.
3. For a more reliable calibration, get out of the sensor’s measuring area now.

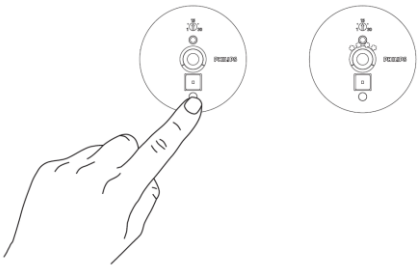
   After 10 seconds the OccuSwitch DALI takes the current light sensor value as new set point.
   The LED stops its visual indication and the luminaires flash once indicating that calibration is completed.

Caution: When the OccuSwitch DALI is calibrated manually with the push button and using an IR control, the offset can be different from an automated mode.

Automatic calibration with the push button and installed light level

The following tools are required for this method:

- Push button or infrared remote control unit
- Stepladder for operating the service button.



1. Press the push button on the OccuSwitch DALI for at least 3 seconds.
   The LED blinks in a cycle of “long yellow – short green” to indicate that calibration is about to start.
2. Within 10 seconds, press the push button again.
   The LED blinks in a cycle of “long red – short green” to indicate that calibration is about to start.
3. For a more reliable calibration, get out of the sensor’s measuring area now.

   After 10 seconds the OccuSwitch DALI switches the lights OFF.

   After 2 seconds the OccuSwitch DALI takes a measurement of the Light sensor to measure the light level when the lights are OFF.

   The OccuSwitch DALI then switches the lights ON at 100%.

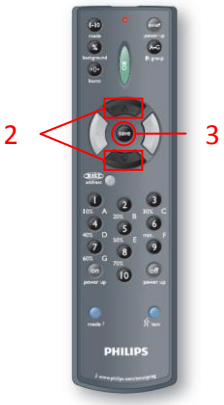
   After 10 seconds the OccuSwitch DALI takes a measurement of the Light sensor to measure the light level when the lights are fully ON.

   The LED stops its visual indication and the luminaires flash once indicating that calibration is completed.

Calibration with remote control

IRT8097/00

IRT8099/10



1. Place a light meter on a representative place.
2. Measure the light level and adjust it by pressing the **Arrow keys**.
3. If the light level is adjusted to the correct value, press **Save** button.
   The luminaire blinks to indicate that the setting has been stored.

NOTE

At all actions, stay close to the OccuSwitch DALI and point the remote control towards the sensor.

4.2.5. 100 hour burn-in mode

Most lamp manufacturers advise not to dim (to a low level) the fluorescent lamps for a period of 100 hours prior to normal use, in order to maintain light quality at (very) low dimming level.

The OccuSwitch DALI 100h burn-in mode adapts all dimming functions during this period, to make sure that the lights are not dimmed. Only during witnessing (to test the installation) and commissioning, dimming is allowed to make the necessary adjustments.

See also Chapter 1.8.1 '100 hours burn mode' for more explanation on this mode.

The 100 hour burn-in mode can only be set on the IRT8097.

1. Point the remote towards the OccuSwitch DALI and press 100h to enable or to disable the parameter.

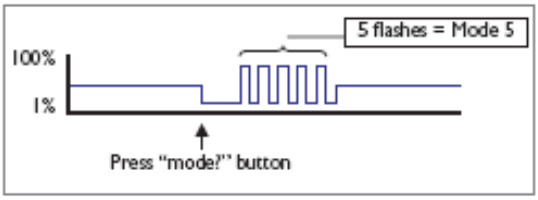
   The luminaires will flash once to confirm the selection.

   When the 100h burn-in mode is active, the LEDs on the OccuSwitch DALI are continuously green when the lights are switched on. (The LED may blink when motion is detected).

4.2.6. Request application mode

The OccuSwitch DALI controller has 10 pre-defined application Modes. The default application mode is Mode 1 (Cell office). The IRT8099/10 can be used to request the actual application mode.

1. Point the remote towards the OccuSwitch DALI and press **Mode?**. The luminaires dim, and then start to flash. The number of light flashes is equal to the actual application mode, as displayed in figure below.



4.2.7. Mass programming

The ease the commissioning process of a whole installation, the IRT8099 can be pre-programmed with the application mode, the background level, the power-up state and infrared group address. These four settings will remain stored in the IRT8099 remote, and are sent each time the green **OK** button of the remote is pressed. For resetting these values, see section 4.3.

4.2.8. Set application mode

The OccuSwitch DALI controller has 10 pre-defined application modes. The default application mode is Mode 1 (Cell office). The IRT8099/10 can be used to set the application mode.

1. Press **Mode 1...10**.
   The LED on the transmitter starts to blink.
2. Select the user mode.
   The LED will stop blinking, the mode is now set within the remote.
3. Point the remote towards the OccuSwitch DALI, and press the green **OK** button.
   The remote sends all stored settings (application mode, power-up state, background lighting level and IR group).
   The luminaires will flash once to confirm the selection.

4.2.9. Background level

In some application modes, the light level of all outputs is set to a “background” level if there is no movement detection for 15 minutes. This background level is by default set to 20% of the maximum output level, but can be changed with the IRT8099.

1. Press **Background**.
   The LED on the transmitter starts to blink.
2. Select the background level (10% - 70%, or “min.”).
   The LED will stop blinking, the background level is now set.
3. Point the remote towards the OccuSwitch DALI, and press the green **OK** button.
   The remote sends all stored settings (application mode, power-up state, background lighting level and IR group).
   The luminaires will flash once to confirm the selection.

NOTE
The “background period” is defined by the application mode and cannot be changed.

4.2.10. Power-up state

The power-up state defines what action the OccuSwitch DALI takes after a power-up or a power interrupt:

- If the power-up state is set to OFF, the OccuSwitch DALI will keep the luminaires off during the first 20 seconds after power-up (sensor stabilization time). After these 20 seconds, OccuSwitch DALI will start normal operation:
  - No movement detection: luminaires will stay off.
  - Movement detection and insufficient daylight: luminaires will be switch on.
- If the power-up state is set to ON, the OccuSwitch DALI will turn the luminaires on immediately at power-up. If no movement is detected, the lights will turn off after 5 minutes.

The power-up state can be set to OFF or ON by means of the IRT8099/10.

1. Press **Power up**.
   The LED on the transmitter starts to blink.
2. Select the power-up state.
   The LED will stop blinking, the power-up state is now set.
3. Point the remote towards the OccuSwitch DALI, and press the green **OK** button.
   The remote sends all stored settings (application mode, power-up state, background lighting level and IR group).
   The luminaires will flash once to confirm the selection.

4.2.11. Infrared group address

The Infrared group address (group A, B, C, D, E, F or G) of each OccuSwitch DALI controller can be set by means of the IRT8099/10. The infrared group address of the remote control unit must be set on the remote control unit itself (rotary or dip switches). See section xx.
Changing an infrared group address is only useful if infrared is used in open plan offices (personal light control).

1. Press **IR group**.
   The LED on the transmitter starts to blink.
2. Select the IR group.
   The LED will stop blinking, the IR group is now set.
3. Point the remote towards the OccuSwitch DALI, and press the green **OK** button.
   The remote sends all stored settings (application mode, power-up state, background lighting level and IR group).
   The luminaires will flash once to confirm the selection.

4.3. Reset to factory defaults

The OccuSwitch DALI system can be set to default factory settings (out of the box settings) using the IRT8099.

1. Press **Basics**.
   The LED on the transmitter starts to blink.
2. Point the remote towards the OccuSwitch DALI and press the green **OK** button.
   The luminaires will flash once to confirm the reset.

NOTE

If you pressed the **Basics** button by error, you can cancel the action by pressing it again. The LED on the transmitter will then stop blinking.

NOTE

Reset to factory defaults resets the following parameters:

- Application mode (default: 1)
- 100h burn-in mode (default: off)
- Power up state (default: on)
- Background level (default: 20%)
- IR group (default: A)
- DALI groups of all connected luminaires (OccuSwitch DALI will work in uncommissioned mode)
- All EnOcean bindings

TIP

The **Basics** button also clears the settings in the IRT8099 (mode, power-up state, background lighting level and IR group), if stored. To clear the settings only from the remote, cover the remote's IR LED while pressing the green **OK** button.

4.4. Perform witnessing test

To check that the OccuSwitch DALI system is correctly installed and commissioned, the OccuSwitch DALI system can be set into witnessing mode. In this witnessing mode, all actions of the OccuSwitch DALI run at a high speed (10 times faster than normal), movement detection period is set to 30 seconds (independent of potentiometer settings), and daylight dependent switching and daylight override are disabled.

The witnessing mode can be enabled and disabled using either the IRT8097 or the IRT8099 tool.

Enter witnessing mode

IRT8097/00

IRT8099/10

1. Point the remote towards the OccuSwitch DALI and press **Test** to enter the witnessing mode.
   The LEDs on the OccuSwitch DALI will start running a color sequence.

Leave witnessing mode

IRT8097/00

IRT8099/10

1. Point the remote towards the OccuSwitch DALI and press **Test** to leave the witnessing mode.
   The luminaires will flash twice to confirm the end of witnessing mode.
   The OccuSwitch DALI returns to normal operation.

NOTE

After one hour of being in the witnessing mode, the OccuSwitch DALI will automatically return to normal operation. In this case it also flashes the luminaires twice.

5. Technical Specifications

5.1. LED feedback

The OccuSwitch DALI provides feedback through different blinking patterns of the LED indicator.

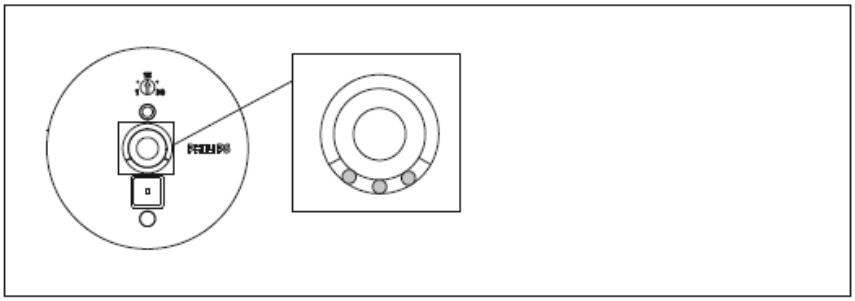


Figure 13: LED indicators of the OccuSwitch DALI

The following table shows an overview of the possible LED indications.

Blinking Pattern	Color	Cause
Irregular	Red	Motion is detected or IR command is received, and the window light output is above 70%.
Irregular	Yellow	Motion is detected or IR command is received, and the window light output is between 40% and 70%.
Irregular	Green	Motion is detected or IR command is received, and the window light output is below 40%.
Cycle (0.5 s per color)	Green – Yellow – Red	Witnessing mode is activated.
Three short blinks (within 0.5 s)	All (Red, Green and Yellow)	A parallel link event is detected during witnessing mode. This only shows once for each parallel link event.
Long – short (1.5 s - 0.5 s)	Yellow – Green	Manual set-point calibration by pushbutton is in progress.
Long – short (1.5 s - 0.5 s)	Red – Green	Automatic set-point calibration by pushbutton is in progress.
Long – short (1.5 s - 0.5 s)	Green – Red	DALI addressing is activated with an IR remote control.
Long – short (1.5 s - 0.5 s)	Green – Yellow	EnOcean teach mode is activated.
Continuous color	Red	• An external short-circuit is present on one or both DALI outputs, • The parallel link is not correctly connected, • There are two OccuSwitch DALI on the same DALI line.
Continuous color	Yellow	An internal error has occurred.
Continuous color	Green	Burn-in mode is enabled by IR, the window light output has not passed the 100 hours yet and at least one of the light outputs is at 100%.
Very fast blinking	Any	An infrared interference has occurred. Too many IR remote controls used at the same time or too much infrared light.

5.2. Settings overview

This section gives an overview of the OccuSwitch DALI parameters. Separate tables are given for mode-dependent and mode-independent parameters. These tables are only to be used by expert level users, please contact your local sales representative.

Table 11: Mode-dependent parameters

		Cell office	Open plan	Class room	Cell office (no motion detection)	Open plan (no motion detection)	Corridor	Restroom	Meeting room	Open plan with parallel link	Custom (3)
	Mode number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Occupancy mode	disabled				X	X					
	Manual on – auto off			X					X		
	Auto on – auto off	X	X				X	X		X	
Parallel Link Application	Background lighting									X	
	Local occupancy	X	X	X	X (1)	X (1)	X	X	X		
Daylight override	disable							X	X		
	Window only	X	X	X (1)	X (1)	X (1)				X	
	Window + corridor						X				
Daylight dependent regulation	disable							X			
	enable	X	X	X	X	X	X		X	X	
Daylight dependant switching	disable							X			
	Window only	X	X		X	X			X	X	
	Window + corridor			X			X				
Smart timer	0 min							X			
	5 min										
	10 min	X	X	X	X	X	X		X	X	
	15 min										
Background period timer	0 min	X		X	X	X			X	X	
	15 min							X (2)			
	30 min										
	60 min						X				
	90 min										
	120 min		X								
	150 min										
	infinite										

1 These settings are not relevant in this mode, but do have this value

2 In mode 7 the background timer only applies to the portal luminaires.

3 The custom mode can only be selected by changing a parameter. The OccuSwitch DALI then switches automatically to mode 10, and copies all other parameters to mode 10.

Table 12: Mode-independent parameters

Parameter	**Range**
Power-up state*	Lights OFF, Lights ON (default)
Background level*l	10% 20% (default) 30% 40% 50% 60% 70%
Mode setting*	1 (default), 2, 3, 4, 5, 6, 7, 8, 9, 10
Infrared group*	A (default), B, C, D, E, F, G
Fade time	0.7 (default), 1, 1.4, 2, 2.8, 4, 5.7, 8, 11.3, 16, 22.6, 32, 45.3, 64 seconds
Burn-in mode**	Enabled Disabled (default)
Motion detect timer***	Potentiometer setting, 70 seconds, 5, 10, 15, 20, 25, 30, 35 minutes Default: potentiometer setting
Light sensor correction***	Disabled, -40%, -30%, -20% (default), -10%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%
Feedback LED***	Enabled (default) Disabled

* Can be changed with the OmniProg (IRT8099/10)
** Can (only) be changed with the OmniProg (IRT8097/00)
*** Cannot be set by an user, please contact your local sales representative.

6. FAQ

Q: The LED indicators of the OccuSwitch DALI constantly show red?
For an explanation of the LED indicators, see Section 5.1.

Q: The LED indicators are continuously blinking?
For an explanation of the LED indicators see Section 5.1.

Q: All luminaires are at the same light level and there is no daylight regulation?
There may be too many luminaires connected to the OccuSwitch DALI. Disconnect all but one Luminaire to see if daylight regulation functions with one luminaire connected.

Q: All luminaires have a constant light level of 100% (emergency mode)?

The possible causes are:

- The DALI line may be in short-circuit,
- There may be two OccuSwitch DALI on the same DALI line,
- There are too many ballasts on one DALI output,
- The DALI input line is not powered.

7. Datasheet